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June 5, 1992

HAND DELIVER

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, DC 20554

Dear Ms. Searcy:

On behalf of Capital Cities/ABC, Inc., transmitted herewith for filing with the Commission are an original and five copies of comments in ET Docket No. 92-9.

If there are any questions in connection with the foregoing, please contact the undersigned.

Sincerely yours,

Mary E. Landergan

Mary E. Landergan

MEL/ak
Enclosures

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies	)	ET Docket No. 92-9

COMMENTS OF CAPITAL CITIES/ABC, INC.

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Counsel for Capital Cities/ABC, Inc.

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In the Matter of	)	
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Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies	)	ET Docket No. 92-9

To: The Commission

COMMENTS OF CAPITAL CITIES/ABC, INC.

Capital Cities/ABC, Inc. ("Capital Cities/ABC") submits herewith its Comments in response to the Commission's Notice of Proposed Rule Making ("Notice") concerning the establishment of new areas of the spectrum to be used for emerging telecommunications technologies.

Introduction

Capital Cities/ABC is the owner and operator of eight television stations and the ABC Television Network, and has an ownership interest in ESPN. Broadcast and cable auxiliary services for each of these entities substantially utilize spectrum in the 1.99-2.11 GHz range in connection with news, sports and entertainment programming. For the reasons set forth herein, it is a matter of operational necessity that

this spectrum continue to be available for these uses. This already crowded spectrum will be further congested by HDTV.

Our interest in this proceeding is in preserving the ability of our stations, television network and cable programming services to utilize this spectrum for important broadcast and cable television purposes. The public has a vital interest in maintaining the ability of networks, local television stations and cable systems throughout the country to broadcast news and other programming to meet the needs of their communities and the nation at large. Our Comments are limited to this spectrum allocation issue.

Spectrum Allocation

In the Notice, the Commission seeks comments on its proposal to designate new frequency bands for emerging telecommunications technologies from 220 MHz of the spectrum between 1.85 and 2.20 GHz. The Commission indicates that its "study concludes that it is not practicable at this time to relocate the broadcast auxiliary ... services that use spectrum in the 1.85-2.20 GHz range."[1] We strongly support the Commission's decision not to relocate these broadcast auxiliary services and set forth herein reasons why this band is vitally important to broadcasters and cablecasters.

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[1] Notice of Proposed Rulemaking, February 7, 1992, FCC 92-20, paragraph 18.

The 1990-2110 MHz band is the primary television electronic newsgathering band. This band is also the primary band for other important television mobile broadcast auxiliary services for sports and entertainment programming purposes. As the attached Engineering Statement of Kenneth J. Brown ("Brown statement") demonstrates, the 1990-2110 MHz band is currently heavily used. In fact, as a result of the growth in the number of broadcasters and cablecasters using electronic newsgathering equipment and other mobile equipment, today in major markets there are fewer channels than the number of program originators desiring access to this spectrum. This requires sharing and coordination among broadcasters and cablecasters, a substantial group yet one small and homogeneous enough to make real-time coordination possible. If this spectrum were to be shared with other mobile services, coordination would become impractical or impossible.

Also, sharing the spectrum with other nonconforming fixed users would either routinely disrupt the fixed users or else render the spectrum unusable for the transmission of news, sports or entertainment actualities in the vicinity of any fixed users. Because of their substantial need for mobile operations in the 2 GHz broadcast auxiliary band, broadcasters have voluntarily given up most of their fixed link licenses in this spectrum and instead have applied for fixed licenses in the 7 GHz and 13 GHz bands.

This already crowded spectrum will be further congested with the advent of HDTV. In fact, to the extent there is any unused spectrum within this band, it is likely that it will not even be sufficient to satisfy HDTV needs. As the FCC Advisory Committee on Advanced Television Service recently reported, "[b]ased on an extensive analysis of broadcast HDTV distribution and support circuits requirements, PS/WP-3 has concluded that some additional broadcast auxiliary spectrum may be required to support ATV service in large markets."[2]

We agree that it is not "practicable" to relocate the broadcast auxiliary services that use spectrum in the 1.99-2.11 GHz range for several reasons. The mobile nature of stations', cable systems' and networks' auxiliary services requires the use of this spectrum with its desireable propagation characteristics.[3] This spectrum also accommodates the small size, light weight and reliability of the equipment used for mobile purposes.[4] Nor would it be workable to move electronic newsgathering and other mobile broadcast auxiliary services to higher frequencies because the technique of bouncing signals off buildings, which is necessary in order to obtain adequate coverage of news in metropolitan areas is

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[2] Fifth Interim Report of FCC Advisory Committee on Advanced Television Services at 3 (March 24, 1992).

[3] See Brown statement at 2-3.

[4] See Brown statement at 1-3, 8.

not possible at higher frequencies.[5] Foliage losses also frequently prevent the use of higher frequencies since news sites do not often have clear transmission paths.[6]

In addition, as discussed above, any spectrum that is used for the mobile broadcast auxiliary purposes such as electronic newsgathering, if it is to be suitable to that use, should be exclusive to broadcasters and cablecasters in order to achieve manageable and feasible coordination. Finally, broadcasters have a substantial investment in existing mobile broadcast auxiliary service equipment which would require either replacement or extensive modification to shift to other spectrum.

The OET report (OET/TS 92-1) supports the Commission's wise conclusion not to move these mobile broadcast auxiliary video services. The attached statement of Kenneth J. Brown elaborates further on some of the technical issues mentioned in the OET Report and illustrates in more detail technical reasons why it is vital that the mobile broadcast auxiliary services remain in this spectrum.

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[5] See Brown statement at 8. See also Engineering Statement of Kenneth J. Brown, dated September 28, 1990, (FCC Docket 90-314) at 2-3 (attached herein to Brown statement).

[6] See Brown statement at 8-9.

Conclusion

For the reasons stated herein, Capital Cities/ABC strongly supports the Commission's decision not to relocate the broadcast auxiliary services that use spectrum in the 1.85-2.20 GHz range.

Respectfully submitted,

By: Mary E. Landergan

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Kenneth J. Brown
Manager, Allocations
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June 5, 1992

ENGINEERING STATEMENT OF KENNETH J. BROWN
IN CONNECTION WITH
COMMENTS OF CAPITAL CITIES/ABC, INC.
REDEVELOPMENT OF SPECTRUM TO ENCOURAGE INNOVATION IN THE USE OF NEW TELECOMMUNICATIONS TECHNOLOGIES
ET DOCKET 92-9

I am Manager of Allocations and Licensing for the American Broadcasting Companies, Inc., a wholly-owned subsidiary of Capital Cities/ABC, Inc., with offices located in New York City. My education and experience are a matter of record with the Federal Communications Commission.

This statement has been prepared for filing in connection with the Comments of Capital Cities/ABC, Inc., in response to the FCC's Notice of Proposed Rule Making (NPRM) in the above-captioned proceeding.

We commend the Commission on its initial conclusion at par. 18 of the Notice of Proposed Rule Making (NPRM) that "it is not practicable at this time to relocate the broadcast auxiliary...services...". This conclusion, drawn from the OET report OET/TS 92-1 "Creating New Technology Bands For Emerging Communications Technology", was based on certain facts also discussed in that report. Based on our review of the report and the NPRM, and our extensive knowledge of and experience in television operations, we believe that there are certain additional facts which tend to support the Commission's conclusion but are not set forth in the OET report or the NPRM. The purpose of this statement is to present and discuss those facts, and to support the Commission's conclusion that the Broadcast Auxiliary Services operating in the 1990-2110 MHz spectrum (BAS 2 GHz band) may not be relocated and that this spectrum may not be practicably shared with PCS. I also attach my engineering statement filed in support of Comments on October 1, 1990 in GEN Docket 90-314, Amendment of the Commission's Rules to Establish new Personal Communications Services, as it has relevance here.

At par. 12, the NPRM discusses the findings of the study with respect to limitations of "compact, lightweight, portable electronic components" to operate at frequencies less than 3 GHz. Also, at footnote 17 to the NPRM, the Commission states "Mobile communications necessarily will always require use of radio spectrum." These statements seem to have been based on similar statements contained in the introduction to the OET Report and supported in Sections 3.1 and 3.2. Both of these observations apply as well to TV Broadcast Auxiliary use of this spectrum as to proposed PCS, because both are mobile.

In Section 3.3.2 of the OET Report, both fixed and mobile uses of the Broadcast Auxiliary spectrum, closely coordinated, are mentioned. However, we would like to point out that the primary use of the BAS 2 GHz band tends to be mobile. This is the primary Electronic News Gathering (ENG) band. The NAB has prepared and filed in General Docket 90-314 (with Joint Comments of the National Association of Broadcasters, Radio-Television News Directors Association, and the Cable-Satellite Public Affairs Network, dated January 9, 1992) a "Report on the NAB 2 GHz TV Auxiliary Facilities Survey," which shows the heavy mobile or ENG usage of many member TV stations. Usage by some cable systems and cable networks tends to be similar. This spectrum is used for news, sports, and even some entertainment programming.

However, Capital Cities/ABC, as the owner and operator of the ABC Television Network and part owner of ESPN cable sports network, wishes to point out several network uses of BAS 2 GHz spectrum which are uniquely portable. We are referring to the so-called point-of-view camera, a miniature camera-transmitter system which is installed and operated in real-life locations from which live pictures are desired and in which video recorders are generally impractical due to size and ruggedness requirements. Such devices have been installed in many no-longer-unusual locations such as America's Cup sailboats, Indianapolis and Formula One racecars, and Olympic skiers. Other examples include: ABC installed one in the headdress of a skater during the Calgary Olympics closing ceremonies and in the hat of a band member during a subsequent Rose Parade; CBS installed one in the hat of a US Olympics team member for the Opening Ceremonies in France this past winter. Cameras have been installed and used in football helmets and on members of racecar pit crews, in bobsleds, and on the starting gates of horseraces. These devices must be extremely small, light, and generally unobtrusive, while remaining very rugged. Transmit antennas from such devices can hardly be high gain or very directional, nor can they be aimed since they are in constant motion, and the signal must get through under highly adverse conditions. Of all the microwave bands available to us, only BAS 2 GHz allows us to do all these things.

Microwave spectrum, including the BAS 2 GHz band, is also heavily used more traditionally in various kinds of network news and sports coverage, where cabling is highly impractical or impossible. ABC makes extensive use of hand-held cameras to provide close-up views with immediacy highly valued by our viewers. We use portable on-course cameras in association with golf coverage, portable pit area and winner's circle cameras for auto racing, portable stable area and winner's circle cameras

for horse racing, mobile cameras on race courses such as marathons and bicycle races, and aerial camera shots from helicopters and blimps, all of which must be relayed by microwave. Some events, especially long-course races such as cross-country races and marathons, must be almost exclusively covered by microwave cameras. The annual New York City Marathon is a prime example: we have found it out of the question to wire for fixed cameras more than a few tiny portions of the twenty-six mile course, which enters all five boroughs of New York City, and we cover almost the entire event from microwave-equipped camera motorbikes with signals relayed by helicopters. During the 1989 San Francisco Earthquake, the blimp camera/microwave system which had been prepared for the World Series provided the first live pictures of the damaged Bay Bridge and of the damage and fires in the Marina District, starting within the first hour after the quake. Dramatic pictures of the recent Los Angeles riots, obtained live from microwave-equipped camera aircraft, have had nationwide impact. Hand-carried RF cameras are also heavily utilized during political conventions, though the dramatically shorter distances involved within a building often allow higher frequencies to be used.

The points of this discussion are twofold. First, the very criteria of mobility and ease of transport cited for PCS also apply fully to television video microwave usage. One difference is that much longer distances must often be covered by the video microwave shots, calling for more capable transmission frequencies. Another difference is that millions of people may be depending on a single video link feeding television receivers nationwide, while failure of a single PCS link would inconvenience few (generally two) people. While Personal Communications Services are described as new technology just over the horizon, mobile video capabilities have become an essential part of our business and are expected by the viewing public.

Secondly, while the OET Report is quite correct in stating, at page 10, "...the demand for ENG frequencies frequently exceeds the available 2 GHz capacity", it is quite misleading to continue, "At other times, however, ENG facilities may not be used for long periods of time." While certain facilities of certain broadcasters may lie idle between peak usage times, it is that very fact which has allowed sharing of this limited spectrum to work as well as it has to date, because different users need spectrum at different times. On weekday mornings, morning show crews operate. Then the noon news crews of other broadcasters operate. The early afternoon may be used for pre-feeds for the evening news and/or for test and setup of the

sports crews preparing for weekend operations, who may also be doing weekday afternoon operations for live-on-air or live-to-tape programming. Late afternoon and early evening sees heavy news use, with lesser use before and during the late night news. Granted, during the time between 11:30 PM and 6:00 AM local time, things tend to be fairly quiet, but this time is not heavily sought for other services either. On weekends, sporting events generally take place with itinerant network coverage which would be utterly impossible during weekdays. And, of course, major news stories can break any time, any place, and completely disrupt whatever else was planned (as the San Francisco Earthquake disrupted the World Series and made sudden fierce demands for microwave facilities to cover the disaster). Any time and every time is news time, and the spectrum and facilities must be kept available on an instant's notice, or the public is seriously disserved. And since the very same small bit of spectrum must fill the primary requirements of all television services, local and network, over-the-air and cable, news and sports and entertainment, disruption of the 1990-2110 MHz spectrum would seriously disrupt the entire American television service.

It should be noted that Satellite News Gathering (SNG), though a worthwhile technique in itself, is not a valid replacement for the BAS 2 GHz microwave spectrum, for at least five reasons. First, satellite video feeds cannot be accomplished with extremely small, portable, nearly non-directional antennas needed for truly portable in-motion operation. Aim at the satellite cannot be maintained and the available signal power is usually a small fraction of that needed to reach a geosynchronous satellite. Secondly, even in traditional ENG operations, such as van-based operations where the truck is parked before operation, the size of earth station antenna required to comply with 2 degree spacing simply cannot be used in many locations, as it requires entirely too large a vehicle. Thirdly, many news locations, especially in urban areas, are blocked from direct view of the satellite. Fourthly, there is entirely too much reuse of BAS 2 GHz frequencies from market to market to permit the spectrum allocated for SNG operations to handle the traffic load. Fifthly, even if it were technically possible to use SNG to replace traditional ENG, the cost of the ground equipment and the satellite time would be prohibitive.

Footnote 15 on page 10 of the OET Report suggests that video compression may provide solutions to the spectrum problem by reducing the requisite bandwidth. We respectfully suggest that this concept is theoretically naive and practically unlikely, at least for the forseeable future; we would be

frankly delighted if it were realistic. Briefly, the video compression schemes so far developed depend on 1) interleaving the information for multiple pictures into essentially one video signal, 2) on channel splitting to transmit more information within a given bandwidth, or 3) on utilizing algorithms to reduce the amount of information needed to transmit a picture and to send the reduced amount of information via an efficient modulation scheme.

The first-mentioned video compression technique requires the signals to be integrated from a single location. The second requires carefully controlled relative power levels (such as in half-transponder satellite video operations) and often reduced guardbands and reduced modulation levels, which render signals more susceptible to interference. These two techniques are totally impractical when the signal sources are not co-located or under common control. These concepts are even less realizable when signal sources may be moving with respect to each other and to the receiver(s), thus causing power levels to fluctuate and locked synchronization to be impractical. Synchronization is now accomplished with one frame synchronizer located at the receive end for each simultaneous (nonsequential) incoming signal. Transmission anomalies from studio to remote site and back would cause field sync controlled from "house" to be too unstable. House-controlled sync schemes such as proposed by TV Answer use MUCH shorter paths which permit locked delays to be controlled.

The third option is comprised of the digital video compression transmission techniques which are outgrowths of the HDTV proceeding. Three generalized digital techniques could be considered: multilevel QAM, multiphase PSK, and OFDM. The 16 QAM technique would allow an NTSC signal to be transmitted in roughly 3 MHz, but it is an amplitude modulated signal (requiring linear amplification) which is extremely fragile. Amplitude linearity across the channel bandwidth and lack of multipath are critical to successful reception, and neither is characteristic of a field operation. The QPSK technique requires more bandwidth (6 MHz for an NTSC signal) but has reduced channel amplitude linearity requirements. Use of nonlinear amplifiers, however, requires bandpass filtering to avoid spectrum spreading. Multipath remains a problem. OFDM (such as proposed for DAB) requires the same bandwidth as QPSK but is relatively robust in that it is relatively insensitive to multipath. However, channel amplitude linearity is critical and linear amplification is required. More information could be carried within the same OFDM bandwidth or the bandwidth (number of carriers) reduced, but the multipath insensitivity would then be compromised.

The problems are, first, that the "relatively robust" technique is still excessively fragile for the needs of electronic news and sports gathering. QPSK and 16 QAM would require incredible levels of error correction to deal with the multipath. Only OFDM could be expected to work with nondirectional or very broad-beam antennas required for point-of-view operations, and channel amplitude linearity remains a problem. Second, a massive amount of equipment is required for any of the three techniques. Even assuming that the channel linearity and multipath problems could be solved and that such a system were chosen for HDTV so the receiver circuitry were highly integrated for use in television receivers, there is no reason to believe that the transmission circuitry would also be integrated below the level necessary for the typical television transmitter plant -- AT LEAST two vertical feet of nineteen inch rack space of equipment (roughly four cubic feet) weighing possibly up to several hundred pounds. What might be at least minimally practicable for a mobile microwave van installation would be totally impossible for portable, airborne and point of view use, and the American public would suffer loss of desired service as a result. The public relies on its television service as a window on the world and as purveyer of critical information in time of need, and it would not be responsible to hold critical newsgathering functions hostage to concepts which may someday become reality -- or may not -- or may only if enough dollars are invested in violation of market principles. For the forseeable future, VLSI (Very Large Scale Integration) techniques can only be practiced cost-effectively where the number of identical chips desired is very large -- larger than the total number of video transmitters employed by all US television stations. VLSI design for low volume production would be reasonable only for overriding concerns such as national defense, barring unforseeable breakthroughs in chip design and fabrication techniques.

A remaining highly critical problem with video compression schemes is the quality of the transmission which remains after further processing, up to and including networking. With every subsequent process or retransmission, quality of the original signal is lost. This may not be a problem with full bandwidth uncompressed digital video, but it is a serious problem with analog and compressed digital signals. The original transmission from the field must be of such quality that subsequent processing and retransmissions will not render objectionable the final picture delivered to the viewer, and the degradation of each process along the transmission path is additive. In short, it is quite likely that techniques which may be viable for the final transmission of television signals to the consumer will not be usable for original picture delivery

from the remote site because the subsequent processing and transmissions necessary for the distribution process would degrade the image unacceptably. Digital video compression schemes after all involve algorithms, and introducing compression before other processes is analogous to inducing round-off error early in a complex mathematical calculation, thus degrading the final result far more than would saving round-off for the last step.

Section 4 of the OET Report discusses feasibility of relocation of facilities for several services. We start discussion of this section with several notes concerning Table 2 (page 14).

We do not necessarily agree that the 6425-6525 MHz band could provide "possible relocation for B/C Fixed", mostly because of the peak loading of these channels, especially at itinerant venues where large numbers of links are leased from common carriers.

Excessive dependence on common carrier circuits (including fiber), especially in today's world, could be counterproductive -- after all, when ATT loses enough circuits to shut down all New York airports, it would be nice to have some assurance that we will still be on the air to report the story. Fiber Optic paths are being phased in where practical, where repetitive use of a particular location is common and where loss of the fiber path during an emergency would not compound the emergency -- assuming, of course, that fiber exists or can economically be installed and maintained to the required sites. Installation is not routinely available to rural transmitter or ENG relay sites, and maintainability is not assured at mountaintop transmitter or ENG relay sites, many of which are subject to earth movement and/or severe precipitation which hazard cable runs of any kind.

The 6875-7125 MHz band is not "Mobile TV Pickup Only", it is shared between mobile and fixed uses. Mobiles operating here are greatly restricted by the need to protect the critical fixed studio-transmitter links which form the primary use of this spectrum.

The 12.7-13.25 GHz band is used for fixed purposes rather more than mobile because it is shared with other services. Mobile uses either operate very low power short hops or place other services at risk of interference, since elaborate interservice prior coordinations are totally impractical for news related uses. It is not useful spectrum for long-distance or cross-town mobile shots in most cases because of the interservice sharing. This spectrum is also heavily occupied by

CARS (Cable Television Relay Service) in some areas.

At Section 4.3.2 of the OET Report, path length issues are discussed. On Page 16, the report states "At frequencies above 6 GHz, microwave systems experience greater free space loss than can be compensated for by increased antenna gain." Ducting and rain attenuation issues are also mentioned. Three necessary factors are, however, not mentioned. One has to do with the effective antenna gain of an antenna which may be carried on a small van, let alone on an aircraft or a highly mobile human being or racing vehicle. ENG van antennas have as much gain as is reasonable for a vehicle which must maneuver with agility through city streets and traffic congestion. It is not reasonable to try to carry an antenna such as an 8 foot parabolic on a mobile news vehicle, and it would be impossible to raise such an antenna into operating position atop a 30 or 50 foot pneumatic mast!

Secondly, the issue of operations using the "building bounce" technique to overcome blocked paths during news coverage in major cities has already been discussed by various parties (see generally comments filed by CC/ABC and NAB in GEN Docket 90-314). This technique does not work at higher frequencies and so cannot be utilized at them. This concept affects the path length discussion in that the length of a path which is blocked but which is the only path available is quite irrelevant to frequency vs. path length discussions; a frequency which will bounce around the obstruction is required. Frequencies much above 2 GHz will not bounce. It should not be misconstrued that broadcasters delight in utilizing the substandard pictures which frequently come from utilizing bounced signals -- broadcasters delight in utilizing the best picture available of an unrepeatable event. A news event only happens once; re-enactments are poor substitutes.

Thirdly, the issue of foliage attenuation is nowhere mentioned in the OET Report, possibly under the misapprehension that antennas can be so located as to avoid or bypass foliage. This may well be possible for permanent installations, but it is not a controllable circumstance for mobile operations. We have found that 2 GHz spectrum propagates through foliage relatively well but that 6 and 13 GHz frequencies are greatly attenuated by surrounding trees and so do not work in cases in which they otherwise would. For example, the home stretch of the annual New York City Marathon is run under the trees of Central Park, and helicopter relay is necessary to get camera signals back to the studio. It is not reasonable for a news van to carry a chainsaw on coverage of suburban stories, in order that a propagation path be literally cut through shrubbery, solely to

allow higher frequencies to be used to establish the link.

At par. 20 and footnote 16 to the NPRM, the Commission has proposed several frequency bands for relocation of fixed services from the 1.85 to 2.20 GHz bands. One of these bands is 12.7 to 13.25 GHz, which constitutes the entirety of what is known as the broadcast auxiliary 13 GHz band. Since the only frequency bands available to broadcasters for video microwave service are 1.99-2.11, 2.45-2.4835 (secondary to ISM), 6.425-6.525 (shared), 6.875-7.125, 12.7-13.25 (shared), and short-path-only frequencies above 17.7 GHz, it is clear that a major portion of broadcast auxiliary spectrum is already proposed to be encumbered by this proceeding. HDTV, whether distributed to the public by broadcast, cable, or recordings, will prove to be of little value if programs cannot be routinely created for it or timely distributed because the critical "backstage" production frequencies are encumbered beyond usability.

DATED: June 4, 1992

Kenneth J. Brown

ENGINEERING STATEMENT OF KENNETH J. BROWN
IN CONNECTION WITH
NOTICE OF INQUIRY
PERSONAL COMMUNICATIONS SERVICES
GEN DOCKET 90-314

I am Manager of Allocations and Licensing for the American Broadcasting Companies, Inc. (ABC), a wholly-owned subsidiary of Capital Cities/ABC, Inc., with offices located in New York City. My education and experience are a matter of record with the Federal Communications Commission.

This statement has been prepared for filing in connection with the Comments of Capital Cities/ABC, Inc., in response to the FCC's Notice of Inquiry (NOI) into the development and implementation of new personal communications services. According to the NOI, one petition (PCN America) has requested the allocation of spectrum in 1700-3000 MHz for a microcell technology based digital communications network. At paragraph 17, the Commission cites PCN America as stating that video transmissions cannot share with spread spectrum systems. We agree. At paragraphs 19 and 21, the FCC invites comments considering the various bands in 1700-3000, especially concerning relocation of existing users.

The 1990-2110 MHz band is the primary television electronic news gathering band. Probably every television station in this country which does any out-of-studio programming or any local newscast has at least one transmission system in this spectrum, and many stations have many systems in regular daily use; WABC-TV owns 19 and uses 16 of them on a daily basis. Television networks and cable systems and networks also use this spectrum; the ABC Televison Network has some 24 such systems based in New York and another 5 based in Washington, all of which travel the country to produce ABC news and sports programs.

This spectrum, as the primary ENG band, is very heavily used, especially before and during the evening "news block". Since it consists of only 7 channels, which is less than the number of program originators needing access to the spectrum in major markets and far less than the number of systems a single active field programming originator would have in daily use, broadcasters and cablecasters commonly coordinate in real time, a "you go then I'll go" type of operation. Signals are transmitted from wherever news (or other programming) is happening to fixed receive or mobile relay points. There is no way to predict where most of these transmission locations will be, or when, because of the immediacy and universality of news

actuality. Live sports coverage is more predictable, but sports coverage must be able to accommodate breaking news.

Further, this spectrum is much more important for live newsgathering than other bands to which broadcasters and cablecasters have access, for two good reasons. First, this band is not shared with non-conforming users, and broadcasters/cablecasters constitute a small enough group that real-time coordination is possible. Any spectrum shared with other mobile services is not practical for news actualities because coordination takes too long (more than 3 or 4 minutes is too long), and so either the band would not be usable for news, or interference would be caused to other spectrum users. Since we cannot choose our transmission sites or times, but rather are subject to the requirements of getting video out of any news location at any time, sharing this spectrum with fixed users would similarly either routinely disrupt the fixed users or else render the spectrum unusable for news actualities in the vicinity of any fixed users. Broadcasters have moved most fixed links out of this spectrum, despite path length penalties, because of the absolute requirement to have this spectrum clear for news coverage. If microcell spread spectrum sites were overlayed on the TV Pickup spectrum, any transmissions too close to TV Pickup receivers would disrupt the received video, and any cell site near a news location would be totally disrupted by the relatively high power video transmissions during the news coverage.

Secondly, this spectrum is low enough in frequency that "building bounce" techniques work. Receive points are chosen carefully to provide the best and most universal coverage possible (WABC-TV has 6 in the New York area), but a practical number of receive locations cannot completely cover all parts of a metropolitan area. Where the path from actuality location to best available receive point is blocked, it is routine (probably 15-20% of city shots) to bounce the signal off of buildings to get the signal through to the receiver. This technique does not work at higher frequencies. This technique also tends to splatter signal around generally in random directions, which would cause serious problems to noncoordinated or fixed site systems, but it is the only technique available in the canyonlike streets of downtown cities. Relaying from rooftops does not work when the roofs are not quickly available or are equally blocked by even taller structures. Because of the routine need to use building bounce, any other spectrum suitable for the purpose must be so close in frequency to the existing band that it is not worthwhile to even consider the high costs of locating such spectrum, clearing it of existing users, and converting so much equipment to operate on the new band. This

frequency range is also useful at getting signal through foliage, a frequent requirement outside central cities. Cutting trees to clear temporary signal paths, as higher frequencies could require, would be most inappropriate.

The broadcast auxiliary allocation in 2450-2483.5 is already subject to interference from ISM and other services. Broadcasters do not use it as heavily as the 1990-2110 allocation simply because it now only contains two (non-grandfathered) channels which are often not available to us due to interference without rather heroic and time-consuming measures. The ABC Network must frequently use it for relaying pictures from point-of-view cameras and risk having interference seen live on air because 1990-2110 is usually full and no other suitable spectrum is available to us. Further degradation of this spectrum or additional restrictions on our ability to use it will directly reduce the amount of actuality pictures available for broadcast to the American public.

DATED: September 28, 1990

Kenneth J. Brown